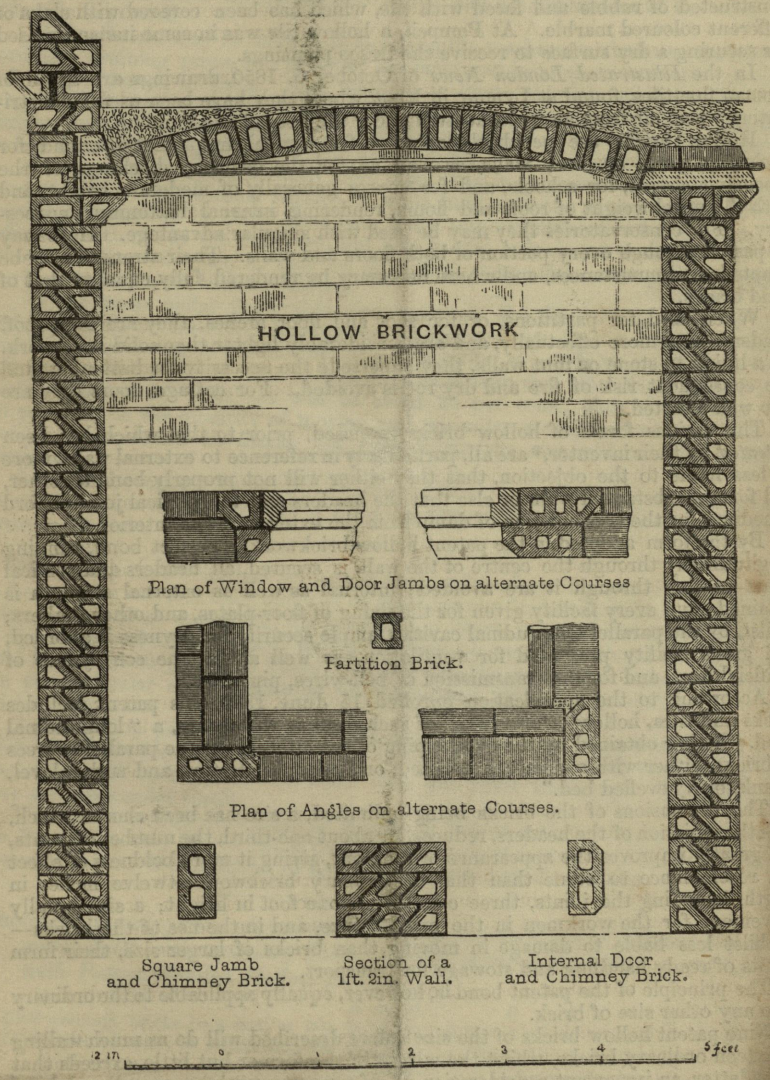
ON

HOLLOW BRICKWORK

And its Various Applications.

Illustrative Example from the Model Structure placed by the Society for Improving the Condition of the Labouring Classes, in the Great Exhibition of 1851. (*Building Court*)—CLASS 27, No. 124.



The above section is also illustrative of the construction adopted in H.R.H. Prince Albert's Model Houses. The span of the arches being increased over the Living Rooms to 10 feet 4 inches, with a proportionate addition to their rise. The external springers are of cast iron, connected by wrought iron tie rods, and the chimney-stacks form an additional abutment.

ON THE FORM AND USE OF HOLLOW BRICKS.

From the Descriptive Account of H.R.H. Prince Albert's Model Houses.

No one conversant with houses of slight construction can be unaware of the evil to which they are so liable from damp external walls and floors; any remedy which effectually secures its removal, without adding to the cost of the building, must prove a great benefit to the occupants of such dwellings; and where a mode of construction effects this object at a diminished cost, it is a boon to the landlord as well as to the tenant.

The use, in architectural construction, of hollow-shaped clay, in a variety of forms, was known to the ancients, and amongst other purposes was adopted by them in lightening the weight of the spandrils to vaulting of considerable span.

For the lining of rubble-stone walls tile was commonly used in Roman buildings. The Colosseum may be instanced as an example, where much of the inner wall is constructed of rubble and faced with tile, which has been covered with slabs of different coloured marble. At Pompeii, a hollow tile was in some instances used for securing a dry surface to receive the fresco paintings.

In the *Illustrated London News* of October 5, 1850, drawings are given of Roman flue-tiles, found at Lymne, in Kent, where they have been used for distributing warm air from an hypocaustum under the floor of the building.

Hollow bricks are peculiarly adapted for agricultural buildings, and for enclosure, park, or fence walls, as well as for the ordinary dwellings of the labouring classes, for schools, and for houses generally of moderate height, and with the usual weight of roofs and floors, rendering internal battening unnecessary. For conservatories they may be used with singular advantage. Heat may be passed through every portion of both floors and walls. Their strength may be adapted to circumstances, and where necessary be rendered fully equal to that of solid bricks.

When used for partitions, or for roof and floor arches, they are fire-proof, deaden sound more effectually, and are considerably lighter than solid brickwork. As a lining to stone or flint walls, they supersede the necessity for battening, and the consequent risk of fire and dry rot is avoided. For cottage floors they are also well adapted.

The various forms of hollow bricks proposed, prior to that which has been *patented* by their inventor,* are all, particularly in reference to external walls, more or less liable to the objection, that they either will not properly bond together, and form a substantial wall, or else that the headers and the vertical joints afford a medium for the transmission of damp from the exterior to the interior.

By the form adopted in the patent hollow brickwork, a perfect bond, running longitudinally through the centre of the wall, is secured, all headers and vertical joints passing through it are avoided; internal as well as external strength is obtained; and every facility given for the fixing of floor-plates, and other timbers; whilst, by the parallel longitudinal cavities, ample security for dryness is afforded, and great facility presented for ventilation, as well as for the conveyance of artificial heat, and for the transmission of bell-wires, pipes, &c.

According to the specification enrolled 15 June, 1850, this patent includes bricks and tiles, hollow or otherwise, of such form as will secure, a "longitudinal bond, whether obtained by the overlapping of the alternate or the parallel courses of bricks, either with a square, a rebated, or a chamfered joint, and with a level, a sunk, or a bevelled bed."

The dimensions of the bricks being unlimited, a size has been chosen which, with the omission of the headers, reduces, by about one-third, the number of joints, and greatly improves the appearance of the work, giving it more boldness of effect and resemblance to stone than that of ordinary brickwork—twelve inches in length, including the joints, three courses rise one foot in height; a size equally convenient for the workmen in the manufacture, and in the use of the bricks——whilst less liable to damage in moving than bricks of larger size, their form admits of ready handling and stowage for transport.

The principle of the patent bond is, however, equally applicable to the ordinary or to any other size of brick.

Nine patent hollow bricks of the size before described will do as much walling as sixteen ordinary bricks, whilst the weight of the former but little exceeds that of the latter, an important consideration in reference to carriage, as well as labour in using.

When passing through the machine, or in the process of drying, any number

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may be splayed at the ends to the rake of gables, be mitred, or be marked for closures, and broken off as required in use; or they may be perforated for the purpose of ventilation. If nicked with a sharp-pointed hammer, they will break off at any desired line; and the angles may be taken off with a trowel as readily as those of a common brick.

A sufficient portion of good facing bricks may be selected from an ordinary burning, and in laying them, a much better bond will be obtained than is usually given in common brickwork.

The splayed bricks may be used for the weathing of plinths for eaves moulding under gutters, and for gable moulding under projecting tiles or slates, in lieu of barge boards. Labels for doors and windows may be made hollow in lengths.

The bricks for the quoins and jambs may be made either solid or perforated; and with perpendicular holes, either circular, square, or octagonal, those in the quoins may be so arranged as to serve for ventilating shafts. Stone will be found equally applicable for the quoins and jambs, and the appearance of the work be thereby improved.

Hollow bricks may be made with any good tile machine, in the same manner as ordinary draining pipes, and at about the same cost in proportion to the quantity of clay contained in them. The material is finer; they are more compressed, require less drying, and with much less fuel are better burned than ordinary bricks, even when waste heat, or that in the upper part of the kiln, only is used, a fire skin being formed both within and without.

The process of drying is much more rapid than in common brickwork, and the smoothness of the internal surface of walls built with the patent bonded bricks renders plastering, in many instances, quite unnecessary, whereby a saving is effected, not only in the first cost, but also in the subsequent maintenance. If glazed on the outer face, as may be done with many clays, a superior finished surface is obtainable without plaster.

When made under favourable circumstances, the fair selling price of the patent bonded hollow bricks is about one-fourth more than that of ordinary bricks, at which rate, owing to the increase of size, a saving of nearly 30 per cent. will be effected; or if the selling price be one-third more than that of ordinary bricks, the saving effected by their use will be about 25 per cent., with a reduction of 25 per cent. in the quantity of mortar, and a similar saving in the labour, when done by *accustomed workmen;* the cost of carriage also will be considerably diminished.

Licences for making Patent Bonded Hollow Bricks are granted by the Patentee, in consideration of the payment of a royalty proportionate, in case of sale, to the price in the field.

On testing the strength of six patent bricks of good quality, put together so as to form a pier one foot long, one foot or three courses high, 9 in. wide, the external sides being $\frac{7}{8}$ of an inch thick, the internal $\frac{3}{4}$ in. thick, it was found that a weight of $6\frac{1}{2}$ tons caused a slight crack, only perceptible by sound, which did not increase until $8\frac{1}{2}$ tons were placed on them. With 9 tons the horizontal beds gave way, the perpendicular sides remaining unbroken, and without any tendency in the bricks to separate.

A 6 in. hollow partition, or arch brick, of good well-burnt clay, 9 in. long, 4 in. thick, the beds $\frac{3}{4}$ in. and the sides $\frac{7}{8}$ in. thick, was tested with 7 tons, when it cracked in both beds; and, with eight tons, the brick broke up. Other trials have given a similar result.

These experiments were made at Messrs. W. Cubitt & Co.'s, Gray's Inn Road; the Patent Bonded Bricks being from the Marquis of Lansdown's Brick Works, Bowood, Wilts; the partition, or arch Brick, from Aylesford, Kent.

Statement, showing the comparative cost of Bricks in a rod of reduced Brickwork, built with ordinary Bricks of the common size, and a rod built with Patent Bonded Hollow Bricks.

	£	s.	d.		£	s.	d.		£	s.	d.
4300 ordinary bricks to a rod, at 20*s.*	4	6	0	at 24*s.*	5	3	3	at 28*s.*	6	0	5
2450 Patent Bonded H. Bricks, do., 25*s.*	3	1	3	„ 30*s.*	3	13	6	„ 35*s.*	4	5	9
Saving in bricks per rod	£1	4	9		£1	9	9		£1	14	8

Being 29 per cent. in favour of using the Patent Bonded Hollow Bricks, in addition to a considerable diminution in the cost of cartage or transport, and of 25 per cent. on the mortar and the labour.

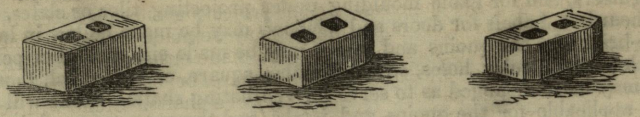
NOTE.—The relative prices given above may be taken as the fair average selling prices in the field, depending on the cost of fuel, labour in preparing the clay, &c.

PATENT BONDED BRICKS. QUOIN BRICK.

No. I. No. 2. No. 3.

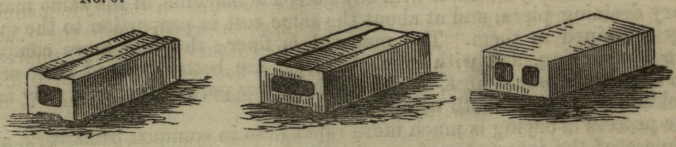
INTERNAL JAMB AND ANGLE BRICKS.

No. 4 A. No. 4 B. No. 4 C.



ARCH AND PARTITION BRICKS.

No. 5. No. 6. No. 7.



No. 1. External patent bricks, 11$\frac{3}{4}$in. long, which, with the quoin brick No. 3, and the jamb brick No. 4, are sufficient for building 9 inch walls.

No. 2. Internal patent bricks, 11$\frac{3}{4}$in. long, required to form any thickness of wall beyond 9 inches.

No. 3. Quoin bricks, 10$\frac{1}{4}$ in. long, with one splayed corner for forming external angles, reveals, and jambs of doors and windows, either square or splayed.

No. 4. Internal jamb and chimney bricks, 8$\frac{3}{4}$ in. long. B and C, show how one or two angles may be chamfered in the process of making by the same die.

No. 5. For 4$\frac{1}{4}$ in. partitions or internal walls, to bond with the splayed bricks, answering also for floor and roof arches, not exceeding 7 feet span.

No. 6. For 5$\frac{3}{4}$ in. partitions or internal walls, and arch bricks, used for floor and roof arches of 7 to 10 ft. span.

No. 7. Ditto ditto with webb to give extra strength, and adapt them for using on edge in partitions 3$\frac{3}{4}$ in. thick, to rise in 6 inch courses.

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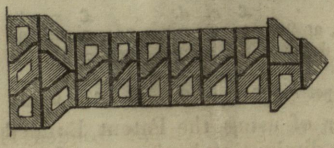
HOLLOW BRICKWORK

And its Various Applications.



SECTION OF A DWARF WALL.

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